CLINICAL EXPERIENCES NURSE ANESTHESIA STUDENTS FIND MOST AND LEAST BENEFICIAL AT THREE STAGES OF CLINICAL EDUCATION

Beverly Dawn Ostermeyer

APPROVED:

Maura S. McAuliffe, CRNA, Ph.D., Committee Chair — Date: 4 Oct 1999

Barbara Sylvia, Ph.D., Committee Member — Date: 4 Oct 99

Susan Hall, Maj., USAF, NC, Ph.D., Committee Member — Date: 27 Sept 99

APPROVED:

F.G. Abdellah, Ed.D., ScD., RN, FAAN — Date
Dean

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CURRICULUM VITAE

Name: Beverly Dawn Ostermeyer.

[redacted]

PII Redacted

Degree and Date to be Conferred: Master of Science in Nursing (1999).

[redacted]

[redacted]

Secondary Education: Moss Point High School, Moss Point, Mississippi, 1983.

Collegiate Institutions Attended: Dates Degree Date of Degree

Uniformed Services University of the Health Sciences. June 1997-October 1999: Masters of Science in Nursing, October 1999
Major: Anesthesia
University of Southern Mississippi. August 1985-May 1987: Bachelors of Science, May 1987
Major: Nursing,
Mississippi Gulf Coast Junior College. August 1983-May 1985: Associate of Arts, May 1985
Major: Nursing

Professional Positions Held:
Staff Nurse Anesthetist, 81st Medical Group, Keesler Air Force Base, Mississippi-November 1999-present
Assistant Nurse Manager, Coronary Care Unit, Wright-Patterson Air Force Base, Ohio-October 1996-May 1997
Assistant Nurse Manager, Intensive Care Unit, Wright-Patterson Air Force Base, Ohio-March 1995-September 1996
Staff Nurse, Intensive Care Unit, Wright-Patterson Air Force Base, Ohio-November 1993-February 1995
Staff Nurse, Special Care Unit, MacDill Air Force Base, Florida-July 1989-November 1993
Staff Nurse, Multiservice Unit, MacDill Air Force Base, Florida-August 1987-July 1989

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ABSTRACT

It is important to identify the clinical experiences nurse anesthesia students find the most and least beneficial to their clinical education. Once identified, clinical curricula can be organized in a way to best meet the students' needs as they progress in becoming providers of anesthesia. No qualitative studies were found that describe beneficial and less than beneficial clinical experiences for nurse anesthesia students. In this study, a purposive sample of nine nurse anesthesia students, in three different phases of clinical education, was interviewed. They answered the question; "what experiences do nurse anesthesia students find the least and most beneficial?" The framework for the study was McAuliffe's conceptual model of advanced practice nursing education. Interviews continued until saturation of the data occurred. The data were analyzed using constant comparative analysis to categorize the data and identify themes. The following eight major categories emerged; clinical experiences, case types, anesthetics, procedures, patient acuity, preceptors, level of supervision, and professional culture. In the three phases of clinical education, student registered nurse anesthetists report specific skills and experiences as more or less beneficial to their learning. While there was some overlap, differences between phases demonstrate that students' learning needs change over time. The results of this study may assist nurse anesthesia faculty in designing improved curricula for clinical education, as well as expand an existing conceptual framework of nurse anesthesia education.

Key Words:**Anesthesia Clinical Nurse Anesthetist Education Beneficial Experiences**

CLINICAL EXPERIENCES NURSE ANESTHESIA STUDENTS FIND MOST AND LEAST BENEFICIAL AT THREE STAGES OF CLINICAL EDUCATION

by

BEVERLY DAWN OSTERMEYER, BSN

THESIS

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FORWARD

This research was conducted to provide information on the clinical experiences nurse anesthesia students in the Graduate School of Nursing, Uniformed Services University of the Health Sciences, found to be most and least beneficial to their learning at three stages of their clinical education. It was designed to improve the clinical curricula for future nurse anesthesia students.

DEDICATION and ACKNOWLEDGEMENT

I dedicate the final creation of this thesis to the most important people in my life, without whom this would not have been possible. The love, support and encouragement of my husband, Dave, saw me through the many hours of work I spent putting this thesis together. In addition, the faith that my family has always had that I will succeed in any endeavor was present in my mind and helped me attain these goals. To all the members of my family, I give my thanks for their love and support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I: INTRODUCTION/AIM OF THE STUDY

Over the years, the number and characteristics of nurse anesthesia programs have changed. There are currently 87 programs in the United States and Puerto Rico. Although all must provide certain core requirements with minimum numbers and types of case experiences, there are some variations in requirement for graduation. The American Association of Nurse Anesthetists (AANA) Council for Accreditation of Nurse Anesthesia Educational Programs (COA) governs program curricula. There has been little research to date about nurse anesthesia education. This has been due, in part, to a lack of educational theory for the teaching of nurse anesthesia.

Maxwell (1996) identified three types of purposes for conducting a study: personal purposes are those that motivate you to conduct the study, practical purposes are those that meet some need or achieve some goal, and research purposes for a study focus on understanding something. The purpose of this qualitative, descriptive study was to explore and describe the clinical experiences that nurse anesthesia students find the most and least beneficial at specified points in their clinical education. This information was used to expand a current conceptual framework for nurse anesthesia education. In addition to fulfilling the personal purpose, study of an area in which I have become involved as a student, and the practical purpose of describing the clinical experiences of nurse anesthesia students, this study also met the research purposes, identified by Maxwell (1996), as those for which qualitative studies are especially suited. It sought to understand the meaning, for the study participants, of specific clinical experiences, and of the accounts they gave of the experiences. It also enhanced understanding of the process by which nurse anesthesia students learn in the clinical area. A qualitative approach was used. Qualitative approaches of research are based on a holistic view. With this in mind, the exploration and description of the clinical experiences of nurse anesthesia students was accomplished through naturalistic inquiry about types of clinical cases and experiences considered to be

the least and most beneficial to their education.

While studies are available that address various aspects of the education of nurse anesthetists, none specifically address students' feelings and experiences using a qualitative approach. A qualitative, descriptive research method was selected because it is useful in studying an area in which little or no research has been reported (Burns & Grove, 1993).

Strauss and Corbin (1990) identified five types of qualitative research: grounded theory, ethnographic, phenomenological, life histories, and conversational analysis. Grounded theory uses a systematic set of procedures to develop an inductively derived theory. The grounded theory approach was used in this study because part of the purpose of this study was to use the derived data to expand an existing conceptual model. Artinian (1988) identified four modes of nursing inquiry within grounded theory, each with a different purpose: descriptive mode, discovery mode, emergent fit mode, and intervention mode. The descriptive mode provides rich detail and must precede all other modes (Burns & Grove, 1993). With the purpose of describing clinical experiences, in essence life experiences, this qualitative research permitted capture of a fuller, richer interpretation of the participant's (nurse anesthesia students) perspectives.

The contributions of this study include the description of the most and least beneficial experiences for nurse anesthesia students. With data obtained, an existing conceptual model of nurse anesthesia education was further explicated, and findings provide a basis for improving clinical instruction.

CHAPTER II: EVOLUTION OF THE STUDY AND LITERARY CONTEXT

According to Denzin and Lincoln (1994), "...qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them by describing routine and problematic moments and meanings in their lives" (p. 2). Lofland and Lofland (1984) believe qualitative research begins with the personal concerns of the researcher and involves determining what they care about. "Without a foundation in personal sentiments, all the rest easily becomes so much ritualistic, hollow cant" (p. 10).

As one of twenty three students enrolled in the Uniformed Services University of the Health Sciences (USUHS), Graduate School of Nursing (GSN), Nurse Anesthesia program, class of 1999, and also experiencing clinical instruction, I have an avid interest in what experiences nurse anesthesia students believe are most and least beneficial. The clinical portion of a nurse anesthetist's education plays an important role in preparing them for independent practice upon graduation. Clinical education includes "hands on" education as a student. By describing the experiences of nurse anesthesia students in the clinical setting, data was generated that increased our understanding of the students' needs throughout their entire educational program.

In grounded theory a review of the literature explains, supports, and extends the theory generated in the study, and is usually conducted at the end of the study; alternatively, the literature review can go on simultaneously with data collection (Patton, 1990). Also, a review of relevant literature can help to focus the study. The brief review of the literature that follows was simply to determine the presence or absence of any studies similar to this study.

In a search of the literature, few references were found about the education of nurse anesthetists; most were focused on nursing in general. The few that were found did not address clinical experiences of nurse anesthesia students from students' perspectives. The

aspects of nurse anesthesia education that were addressed in the literature included: evaluation of clinical faculty, learning style types, characteristics of nurse anesthesia programs and methods of education, student/faculty perceptions of clinical experiences, and analysis of clinical curricula in nurse anesthesia.

Evaluation of Clinical Faculty

Haag and Schoeps (1993) conducted a study to develop a standardized instrument for evaluation of clinical nurse anesthesia faculty by students. Identified limitations of the study were that the data came from military hospitals and could not be generalized to civilian hospitals, and there was restricted variability of data resulting in skewing of distribution and domain. The most glaring reason why the instrument developed from this study can not be utilized is that it has no established validity. Although application of the instrument was tested for reliability with a reliability coefficient of 0.935, it was clearly stated by the authors that "further data are needed to assess the validity of the instrument" (p. 164). Unfortunately, no further work by these authors in this area has been published.

Learning Styles

Sherbinski (1994) looked at learning styles of nurse anesthesia students in a Masters of Science in Nursing (MSN) program. The "Learning Style Inventory (LSI)" (p. 40) identified individual preferred learning styles and correlated them with an experiential learning model. The experiential learning theory (ELT) considers learning a process of lifelong adaptation. One study conducted with generic nursing students identified the dominant learning style as that of "accommodator" (p. 43) which emphasizes concrete experiences and active involvement Nurse anesthesia students, however, "may not fit" (p. 43) the "accommodator" style because of emphasis on the sciences and technical skills. The predominant learning style of nurse anesthesia students in one MSN program was identified as "assimilator" (p. 44) which emphasizes inductive reasoning.

Characteristics of Nurse Anesthesia Programs and Methods of Education

In 1996, Carroll-Perez compared various characteristics of nurse anesthesia programs with success rate on the AANA National Certification Exam (NCE). Characteristics considered included number of students, program length, graduation dates, the number of clinical sites, and the program structure. She found that none of the characteristics measured could be used to predict how graduates would perform on the NCE. A weakness of the study was that it examined only one year of NCE passing rates.

In 1994, Horton and Jordan described a profile of nurse anesthesia programs based on study data from the American Association of Nurse Anesthetists (AANA) Council for Accreditation of Nurse Anesthesia Educational Programs (COA). The profile included program characteristics, such as level of degree offered, admission prerequisites, availability of qualified students for vacant slots, clinical sites, educational experiences offered or available, and faculty. Data for this article were submitted in August, 1993. At that time, 93 programs were recognized by the COA and, of these, 88% offered master's degrees, 11% offered certificates and less than one percent offered a bachelor's degree (Horton & Jordan, 1994). As of January, 1998, there is a mandate that all nurse anesthesia programs must offer master's degrees or higher (COA, 1990).

Horton and Jordan (1994) reported that most programs required prerequisites for admission, with 90% of programs requiring a minimum Grade Point Average (GPA) of 3.0 or greater. The most frequently identified prerequisite courses were physics and chemistry. Ninety one percent of programs required admission tests, with the majority accepting the Graduate Records Exam (GRE), and some accepting either the GRE or the Millers Analogy Test (MAT). Applicants accepted into nurse anesthesia programs were required to possess baccalaureate degrees, though not necessarily a Bachelor of Science in Nursing Degree (BSN). Additionally, applicants were required to complete at least one year working as a Registered Nurse (RN) in the acute care environment before beginning

the anesthesia program.

The availability of qualified students to fill vacant slots varied widely among the nurse anesthesia programs. Some program directors reported the ability to fill all their vacant slots, while others had one to five slots left vacant (Horton & Jordan, 1994). Still others reported having an oversupply of candidates with a limited number of available positions. Tuition was an important factor to the students enrolled in these programs. More students in university-based programs paid tuition with fewer available stipends. In 1993, when data were collected, in-state tuition ranged from $1,600.00 to $26,600 for the entire program, and out-of-state tuition ranged from $2,000.00 to $30,800. Financial status was an important determinant of an individual's ability to apply to a nurse anesthesia program.

A total number of 431 clinical affiliations were reported; the most frequent clinical affiliations were community hospitals and government hospitals, with the most frequently available types of experiences offered in thoracic surgery, general surgery, regional anesthesia, pediatrics, ambulatory surgery, cardiovascular surgery, trauma, and obstetrics (Horton & Jordan, 1994). The COA monitors trends in clinical education in an effort to anticipate whether various programs will be able to meet the number of anesthesia cases required for student learning. Anesthesia cases students have experience with are examined, for example, the number of mask cases and the number of regional anesthetics administered. These minimal case requirements ensure that all nurse anesthesia programs provide experience with all types of anesthesia, for all types of surgery in both children and adults.

In 1995, Chipas stressed the importance of including critical thinking skills in nurse anesthesia curricula. Fletcher (1995) addressed the use of an anesthesia simulator to teach general anesthesia principles in nurse anesthesia education. She compared the use of simulators to those used by pilots, and providing general anesthesia to patients has been compared to flying (McAuliffe, 1993). Horton (1993) addressed the question of "should

student nurse anesthetists be required to administer regional anesthesia?" (p. 497), and supported the establishment of an educational requirement for Student Registered Nurse Anesthetists (SRNAs) to administer regional anesthesia. An opposing, and erroneous, argument from an anesthesiologist was that nurse anesthesia students have an inadequate foundation for learning anesthesia. This was based on his belief that basic nursing education programs provide inadequate foundations for preparing nurse anesthetists to make judgments related to administering regional anesthesia (Jenkins, 1979). This anesthesiologist also believed that two year anesthesia programs offered inadequate time to teach regional techniques. McAuliffe (1993) concluded that nurse anesthesia students desire more experience with regional anesthesia and that nurse anesthetists are capable of administering regional anesthesia.

Student/Faculty Perceptions of Clinical Experiences

Two studies were found about the congruency of student/faculty perceptions of clinical experiences and students' perceptions of clinical education; these are discussed below. However, no true qualitative studies investigating feelings and experiences of the students were found.

Ramsborg and Holloway (1987) conducted a study to determine if students and teachers agree on what makes positive or negative learning experiences in nurse anesthesia education. Each student and teacher gave a brief description of their most positive or most negative teaching/learning experience. Unlike the proposed study, each respondent was asked to relate only one situation. Content analysis of data demonstrated that instructors felt positive teaching experiences resulted from having students who were motivated, enthusiastic, and able to correlate didactic material to the clinical environment. Anesthesia students and Graduate Registered Nurse Anesthetists (GRNAs) reported that positive learning experiences came from mastering a new skill, having instructors who project confidence, and the student winning a degree of independence. Instructors noted

negative teaching experiences resulted from conflicts between members of the anesthesia care team and a dislike for instructing students. Students reported negative learning experiences resulted from frustration with not being able to use their own techniques or care plans and having non-supportive instructors.

Welty and Murray (1993) published findings of surveys, conducted in 1990 and 1992, assessing students' perceptions of their clinical experiences during their clinical education. The surveys differed from the proposed study in that they were quantitative studies using graded scales rather than qualitative studies inquiring about students' personal experiences. The surveys identified various areas in which students perceived any weaknesses in their education. Weaknesses identified included areas such as hands-on regional anesthesia experiences, airway experiences (intubation, ventilator management), and invasive line placement. The authors concluded that future studies should ask similar questions but obtain additional information to clarify data. The proposed study will attempt to illuminate a multitude of thoughts and feelings of nurse anesthesia students as they progress through their clinical education.

Analysis of Clinical Curricula in Nurse Anesthesia

Both the practice and education of nurse anesthetists have been compared to piloting an aircraft and learning to fly. Taking off in an airplane is analogous to induction of anesthesia, landing to emergence from anesthesia, and cruising at altitude to the time between induction and emergence. The continuous monitoring of highly technological aircraft equipment compares with the continuous scanning of patients and equipment in anesthesia. Both situations place heavy demands on cognition and require continuous processing of information (McAuliffe, 1993).

Dreyfus and Dreyfus (1980) identified five stages of mental activities in skill acquisition: novice, competence, proficiency, expertise, and mastery. These were developed by Dreyfus and Dreyfus for the United States Air Force to assist in pilot

training. Benner (1984) used this theory extensively in nursing. In the novice stage, instruction begins by decomposing the task environment into context-free features that the beginner can recognize without prior experience, and rules are given for determining action. Competence comes after considerable experience with real situations. Proficiency is achieved with increased practice in a variety of typical situations (Dreyfus & Dreyfus, 1980).

McAuliffe (1993) utilized principles of Dreyfus and Dreyfus' (1980) theory in her conceptual model of nurse anesthesia education. In her research several conclusions were drawn that are relevant to this study. First, Graduate Registered Nurse Anesthetists (GRNAs) report wanting more experience with various procedures, such as central lines, and more "quality" (p. 150) clinical experiences and instruction. GRNAs report dissatisfaction with not being allowed full participation in the anesthetic management of cases shared with physician anesthesia residents, notably in specialty cases such as cardiac surgeries and neurosurgery. Graduates also report the desire for more instruction and experience in performing regional anesthetic techniques. Most graduates would like more experience with thoracic, vascular, cesarean section, neurosurgical, and pediatric cases as a student. This study attempted to better define those "quality" experiences.

McAuliffe (1993) made several recommendations for future studies that guided this study. One recommendation was that a longitudinal quantitative and qualitative study should be conducted including students, faculty, and employers to determine the relationships between the number and quality of cases and experiences, and adequacy of preparation to function independently in the professional setting. The current study addressed a qualitative aspect of this recommendation, focusing on students' perceptions.

McAuliffe (1993) also recommended that a qualitative study including both clinical faculty and students should be conducted to determine what aspects of declarative, procedural, and conditional knowledge should be emphasized at each stage of the

conceptual model for nurse anesthesiology education. She stated that future research should be conducted to help determine what types of cases and experiences should be included within each stage of the conceptual model. This study addressed this recommendation but only from the student's perspective.

According to McAuliffe (1993), supplying students with more cases is not enough. Students need to be supplied with more cases of a certain type, those that: Allow the students to be actively involved in the planning and implementing of anesthetic care and give the students more autonomy in decision making. The current study attempted to identify the types of cases students perceive to be best.

Summary

A review of literature demonstrated that there is little research concerning clinical education of nurse anesthetists. There is no research qualitatively describing students' perspectives with open-ended questions. This study attempted to elicit free-flowing information with no limitations or restrictions on the information the participants provided, except that necessary for confidentiality, discussed in detail in chapter four.

CHAPTER III: METHOD OF INQUIRY: GENERAL

Qualitative research is defined as any kind of research that produces findings not arrived at by means of statistical procedures (Strauss & Corbin, 1990). In contrast, quantitative research is a formal, objective, systematic process to describe and test relationships and examine cause and effect interactions among variables (Burns & Grove, 1993). Qualitative research makes possible examination of a much broader scope of dimensions of a problem than that usually possible with quantitative research. Quantitative research uses instruments or tools to generate numerical data, whereas qualitative research uses structured and unstructured observation and communication to gather data. Qualitative data are in the form of words and are analyzed in terms of individual responses, descriptive summaries or both. "The focus is on human experience" (Munhall & Boyd, 1993, p. 69).

The qualitative researcher begins by asking: What do I want to know in this study? Identification of the answer to this pivotal question is a critical beginning point. Once it is answered, the methodology for proceeding with the study is selected. Qualitative researchers design a study with real individuals in mind, in some cases intending to live in the chosen setting for a period of time, but always with direct human interaction. This contrasts with a quantitative researcher who plans to obtain large amounts of numerical data with no face-to-face communication.

As previously stated, Strauss and Corbin (1990) identify five approaches to qualitative research: phenomenological research, grounded theory research, ethnographic research, life histories, and conversational analysis. Phenomenological research focuses on understanding the response of the whole human, not specific parts or behaviors, and the lived experience. Grounded theory research is useful in discovering problems that exist and the processes persons use to handle them. Ethnographic research works toward developing a theory of cultural behavior. Historical research, or life histories, describe or

analyze events in the recent or remote past.

Grounded theory offers systematic, legitimate methods to study the richness and diversity of human experience and to generate relevant, plausible theory that can be used to understand the contextual reality of behavior (Munhall & Boyd, 1993). Grounded theory methods can actually be used to "study...program evaluation" (p. 210). Grounded theorists base their research on the assumption that people sharing common circumstances experience shared meanings and behaviors. A theory developed through grounded theory is a theory discovered through data (Glaser & Strauss, 1967). The discovery of a "core variable" (Munhall & Boyd, 1993, p. 191) is essential to the development of a quality grounded theory. This core variable will eventually present itself with continuous references to the data and rigorous analytical thinking. There are six essential characteristics of a core variable: frequent recurrence in the data, it links data together, it explains much of the variation in the data, there are implications for a more general or formal theory, the theory moves forward as it becomes more detailed, and permits maximum variations in analysis. The core variable becomes the basis for the generation of the theory. Some pitfalls exist in using grounded theory that can influence the quality of the proposed theory. A significant pitfall is the failure of a core variable to surface. This can happen with premature closure, causing the theory to be incomplete, lack density, or cover inadequately the behavioral variations.

Burns and Grove (1993) define descriptive research as research that provides an accurate portrayal or account of characteristics of a particular individual, event, or group in real life situations for the purpose of describing what exists and categorizing information. Descriptive studies can be used in both quantitative and qualitative research and are usually conducted when little is known about a phenomenon.

This study was one of qualitative description with the purpose of eliciting data to describe experiences of Student Registered Nurse Anesthetists (SRNAs) in clinical

training. Qualitative research is able to provide reasons behind answers obtained through a pen and paper questionnaire in a quantitative research design. In a qualitative design, the researcher becomes the research instrument (Janesick, 1994), and must, therefore, sharpen the skills necessary for observation and face-to-face interview. There is room for description of the role of the researcher and of the researcher's own biases and ideological preferences. A qualitative design requires ongoing data analyses.

A conceptual framework is an abstract, logical structure of meaning that guides the development of the study and explains, either graphically or in narrative form, the main areas to be studied and the presumed relationships between them (Miles & Huberman, 1994). However, the framework developed may not necessarily be based on a nursing theory. Depending on the topic of study, many theories and conceptual models exist that can be used. The portion of the conceptual model relevant to the phenomena studied needs to be identified. Frameworks are not used the same in qualitative research as in quantitative research; a theory is not being tested. Qualitative research is, however, guided by a particular philosophical stance, and the objectives and questions of a study are based, in part, on the framework of the study. The framework guiding this qualitative study was McAuliffe's (1993) conceptual model of nurse anesthesia education (see Figure 1).

Three main types of human to human measures are used for collecting data in qualitative research: interviewing, observing, and non-verbal communication (Guba & Lincoln, 1981). Interviewing is a frequently used method. The purpose of the qualitative research interview is to describe and understand the central themes the subjects experience and live toward, and the meanings of those themes (Kvale, 1996). The main task of interviewing is to understand the meaning of what the interviewee says. The interview can be initiated by the researcher asking a broad question, such as asking the subject to define an experience related to the topic of study. The role of the interviewer then becomes to

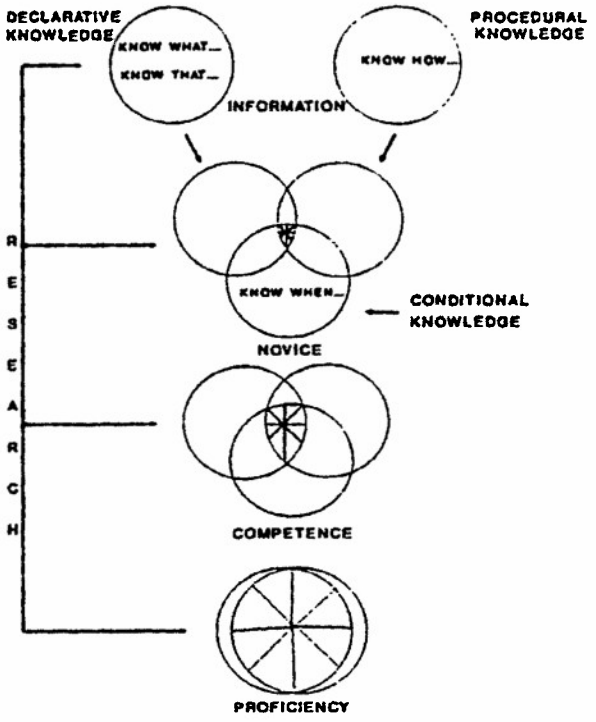

Figure 1. A Conceptual Model for Nurse Anesthesia Education

With permission, from McAuliffe, 1993, p. 84

encourage the subject to continue talking and, in some cases, encourage further elaboration on a particular dimension of the topic of discussion. Encouragement can be given in the form of prompting with brief examples of types of information requested or having the subject participate in storytelling, a sense-making construction of a scenario (Huberman & Miles, 1994).

After deciding on the theoretical framework, research design, and method of data collection to be used, the sample to be studied must be chosen. Sampling is necessary because one cannot "study everyone everywhere doing everything" (Miles & Huberman, 1994, p. 27). First, the population to be studied must be determined, and is defined as all elements that meet certain criteria for inclusion in a given universe (Burns & Grove, 1993). A sample is a subset of the population that is selected for a particular study and sampling is the process by which the group to be studied is chosen. There are four primary types of samples used in qualitative research: purposeful, nominated, volunteer, and a sample of the total population (Morse, 1991); the method selected is based on the type of data the researcher wants to obtain. Purposeful samples are selected according to the needs of the study, for example those who have undergone the experience being studied and whose experience is considered typical. Nominated sampling elicits the assistance of a single informant, already in the study, to assist in the selection of other participants. Sampling by volunteers relies on the potential participants identifying themselves. A sample of the total population can be used when all the informants live or work in a confined area, and is possible only if there is not a large number to sample from. Qualitative studies tend to use small samples. The small sample size may better serve the researcher in in-depth examination of the topic. A sufficient sample size is necessary to adequately describe a phenomenon. In qualitative research, the sample size is usually not predetermined, and often depends on saturation, indicated by "repetition in the information obtained and confirmation of previously collected data" (Morse, 1994, p. 230).

Data collection often results in large amounts of written or typed data in the form of notes or transcripts with multiple pieces of data to be sorted and analyzed. Grounded theory involves a detailed grounding by systematic analysis of the data sentence by sentence by constant comparison (Glaser, 1978). All data is conceptualized into categories and integrated into a theory. The data illustrates the resulting theory, and the process begins with coding and categorizing the data. Data analysis has become more efficient due to the existence of computer programs for analyzing the data.

CHAPTER IV: METHOD OF INQUIRY: APPLIED

Nurse anesthesia is a profession which requires the ability to synthesize multiple types of knowledge and skill to critically think through and manage any given situation. To fully understand how nurse anesthesia students achieve these learning goals, many questions must be answered. In qualitative research, the researcher seeks to explain the lived experiences of individuals from their own perspective.

As previously described, a descriptive, qualitative research methodology was used in this study for the purpose of gathering and analyzing data necessary to describe the experiences of Student Registered Nurse Anesthestists (SRNAs) during clinical education. The source of data was the participant's responses to the researcher's interview questions. An interview guide (see Appendix A) was used to guide how the research question was broached to the participant, although the full course of a semi-structured interview could not be predicted.

Subject Selection and Setting

The sample for this study was obtained through purposive sampling. This involved conscious selection, by the researcher, of participants who possessed knowledge of the subject of study due to their life experiences (Hutchinson & Wilson, 1994). The sample was chosen from military SRNAs, specifically those enrolled in the Graduate School of Nursing (GSN) at the Uniformed Services University for the Health Sciences (USUHS), Department of Nurse Anesthesia. The population for sampling was divided into three levels of expertise; novice, competent, and proficient, using McAuliffe's (1993) conceptual model and time in clinical training. The sample was randomized by placing the names of all students in each phase in a box, then blindly drawing three names for each phase. The students whose names were drawn were the students chosen for interviewing. The criteria for participation in the study was that the participant had recently completed three months, eleven months, or fifteen months of their clinical education in the nurse

anesthesia program. With purposive sampling, efforts are made to achieve representativeness of the settings, individuals, or activities selected for study (Maxwell, 1996), and restricting sample selection to the described population achieved this goal. The decision to use these expertise levels was based on McAuliffe's (1993) conceptual model (see Figure 1), which was the conceptual framework for this study. In this study a novice was defined as a student who had completed the first three months of clinical education. The competent stage was defined as completion of 11 months of clinical education, and the proficient stage was defined as completion of 15 months of clinical education which correlates with the completion date for this program.

Initially, three subjects from each category were asked to participate in the study. As data collection progressed, via interviews, the final sample size of nine was based on the researcher's satisfaction that the data was complete, evidenced by saturation. Contact was made with the participants to determine how to best access them and set up times for interviews. Interviews took place at three different time periods, and participants were asked about a specified time in clinical training, described above. The interviews began in August 1998, and also took place in September 1998.

Data Collection

In the naturalistic inquiry of qualitative research, the researcher is the instrument (Guba & Lincoln, 1981). The human inquirer has the opportunity to explore responses such as reactions, feelings, or inside information that would likely be lost on a standardized questionnaire. Conducting interviews in qualitative research requires skills that demonstrate social sensitivity and sensitivity to grounded theory methodology. These skills include: a) setting aside experiential and theoretical understanding of interpersonal and social interactions at the outset, b) focusing, listening, and carefully clarifying, and c) good interaction/ethical skills (Strauss & Corbin, 1990). The researcher approached this study with openness to new ideas generated by the data, and wrote memos to bracket out

her own ideas before and during the study.

Interviewing participants was the primary source of data collection. First contact with the participant involved providing an explanation of the study, including the value of the participation of the subject, and setting up a time for the first interview at the convenience of the participant. Each participant was told that participation was voluntary and that the interview could be stopped at any time at their request. After initial contact, the participants were given the general, open-ended question to be asked (see Appendix A, Question 1) in advance of the interview, either by telephone or in person.

In order to accurately record all data, interviews were taped with the participant's consent. Study participants were assured that recordings and field notes would be stored in a secure area when not being reviewed. The participants were also assured that any specific names of instructors, facilities, or staff, would be coded for anonymity during transcription and would not be reported. Consent forms were reviewed and signed prior to the interview and remain confidential. All audiotapes were transcribed by the researcher.

The participant's descriptions of their experiences, and of how these experiences were either beneficial or non-beneficial to their learning, provided rich data for constant comparative analysis, the major strategy of grounded theory (Glaser & Strauss, 1967). Each interview was 30 to 60 minutes in length and was semi-structured. A semi-structured interview allowed the participant to guide the interview and illuminate their own perspectives on the topic under study (Hutchinson & Wilson, 1994). The initial interviews began with broad questions. Participants were asked "Based on the last three/eleven/fifteen months of your clinical education, what do you feel were the most and least beneficial experiences in achieving the level of expertise you feel you should have reached?" Probing questions were used in order to deepen the response to a question, increase the richness of data obtained, and give cues to the interviewee about the level of

response desired (Patton, 1990). Story-telling was also encouraged with the participant being asked to describe specific incidents which exemplified their idea of the most and least beneficial experiences. After each interview was completed, the tapes were transcribed verbatim. Data analysis began while interviewing was still under way (Rubin & Rubin, 1995), in that the researcher read these transcripts and generated questions for subsequent interviews. Prior to the start of interviews for the study, a practice interview was conducted with a recent graduate from the Nurse Anesthesia Program at USUHS in order to evaluate the appropriateness of the questions and the effectiveness of communication of the interviewer in obtaining and recording data. The initial questions were expanded and revised based on input from that interview.

Data Analysis

In qualitative research, data collection occurs simultaneously with data analysis resulting in a complex process of data management. Grounded theory is referred to as the constant comparative method of analysis (Glaser & Strauss, 1967). The constant comparative method consists of joint coding and analysis, and its purpose is to generate theory more systematically. In this study the data from each interview was analyzed and used to enhance the selection of questions for the next interview. This constant comparative analysis lead toward development of a theory of process (Glaser & Strauss, 1967), in this case the process of learning nurse anesthesia. Data analysis began with a line by line review of the transcribed interviews. Meaningful segments of the transcribed text were highlighted and code words placed along the margins. This is known as implicit coding, and is a reflection of systematic thinking about the data by the researcher (Glaser & Strauss, 1966).

Coding, the process of grouping interviewee's responses into categories of similar concepts, ideas, or themes (Rubin & Rubin, 1995) occurred at three levels. The first level of coding was substantive or open coding in which the data was coded for as many

categories as might fit (Glaser, 1978). The participant's own words were used to describe the experience, and substantive coding based only on the data helped prevent imposing preconceived ideas onto the data. As coding continued, categories or patterns of codes were identified.

The second level of coding, known as pattern coding (Miles & Huberman, 1994), included the identification of categories and their properties resulting in the grouping of previously coded segments of data into a smaller number of sets or themes. This reduced the large amounts of data into a smaller number of analytic units and helped to develop a scheme for understanding the described experiences. This level of coding was guided by the following questions: What is the data a study of? What category or property does this incident indicate? What is actually happening in the data (Glaser, 1978)?

Level three coding, or theoretical coding, was used to show the relationship of the categories to each other. By conceptualizing the relationship between categories, theoretical coding weaved the story back together again (Glaser, 1978). This process of constant comparative analysis allowed the identification of patterns within the data leading to substantive and formal theories. Data was considered saturated when not enough new information was learned to sufficiently modify core concepts (Glaser & Strauss, 1966), resulting in a total sample size of nine students, three at each clinical phase; novice, competent, and proficient. Implementation of the described qualitative methodology was mentored by the thesis chairperson and committee due to their expertise in conducting research.

Reliability and Validity

The issue of credibility, or validity, is important to the worth of a qualitative study, however, validity and reliability as defined by quantitative research methods do not apply in grounded theory. In qualitative inquiry, the researcher is the instrument, therefore validity hinges to a great extent on the skill, competence, and rigor of the researcher

(Patton, 1990). The reader of the study will, in part, judge the credibility of the analysis done by the researcher. The goal is for the reader to become sufficiently caught up in the description to feel vicariously that they have experienced the described experience (Glaser & Strauss, 1966). The judgment of the reader will also rest upon their assessment of how the stated conclusions were reached. It was the researcher's responsibility to show sufficiently clear statements of description so that readers could carefully assess the credibility of the analytic framework offered. In order to provide the reader with an analytic framework, a tape recorder was used, field notes written, and the process used to collect data clearly described. The researcher described the step-by-step process of data analysis and delineated the development of the categories and the movement to a level of theoretical coding. She provided the readers with rich data taken verbatim from the interview transcriptions in order to help them become caught up in the described experiences. A detailed description of the participants and settings was also included.

The data generated during each interview was confirmed and validated with the participant throughout the interview, and data analysis was ongoing as subsequent interviews were completed. All data was validated by having an auditor review the audiotaped and transcribed interviews. A second interview was necessary for confirmation with some participants that data was correctly interpreted. According to Glaser and Strauss (1967), this is a requisite for theory development. It is, ultimately, a question of validity. If the findings and theory are valid for the participants, credibility and validity have been achieved by following the data. Researchers maintain credibility during the process of data collection and analysis by making any preconceived ideas explicit, monitoring themselves by keeping a journal of ongoing thoughts and feelings (Hutchinson & Wilson, 1994). Throughout the process of generating and analyzing data, the researcher wrote a memo when a thought or idea came to mind. These memos reflected coding decisions, inductive or deductive thinking about developing categories and

patterns, and thoughts on emerging theories.

In addition to credibility, Guba and Lincoln (1994) propose further criteria for determining the trustworthiness of a qualitative study: transferability, dependability, and confirmability. Transferability refers to whether particular findings can be transferred to another similar context while still preserving the particular meanings and interpretations (Leininger, 1994). Since qualitative studies are more concerned with an in-depth understanding of findings than their generalizability, transferability can be accomplished using thick descriptions, descriptions which give the context of an experience rather than simply facts (Denzin, 1994). The researcher provided those thick descriptions through inclusion of the verbatim transcript excerpts as previously addressed, and fully described characteristics of the sample (Miles & Huberman, 1994) so that adequate comparisons with future, similar samples could be made. Dependability, or auditability, refers to the consistency of the study process over time and across researchers and methods (Miles & Huberman, 1994). Confirmability is the degree to which findings are determined by the subjects and conditions of the inquiry rather the than the biases of the researcher. Both are enhanced through the use of inquiry audits and audit trails. Audit trails are decision trails by which a second researcher, using the original data and decision trail, could audit the analysis and conclusions and arrive at conclusions similar to those of the original researcher (Miles & Huberman, 1994). Dependability and confirmability was secured via independent auditing of the data. Bracketing is also a method of dealing with the issue of confirmability. It is the act of consciously laying aside what is known about an experience being studied and is a way for the researcher to identify and articulate potential biases (Janesick, 1994). This technique was reflected in field notes, in the form of memos, as documentation of data or information where bracketing was necessary.

CHAPTER V: FINDINGS OF THE STUDY

Introduction

This research was conducted in order to answer the question, what experiences do nurse anesthesia students find the most and least beneficial to their learning in the clinical phase of their anesthesia education. Using grounded theory methodology, a qualitative study was carried out and data obtained through interviews of nine nurse anesthesia students who had completed one of three phases of the clinical portion of the anesthesia program in which they were enrolled. The sample was made up of three students from each phase, the phases being determined by natural divisions in the program's clinical schedule, and the students randomly selected based on the amount of time spent in clinical training. Constant comparative analysis was used to identify themes and categories from the data collected.

In each of three phases of clinical education, novice, competent, and proficient, SRNAs identified the clinical experiences most and least beneficial to their learning. For each phase, eight major categories evolved, including: clinical experiences, case types, anesthetics, procedures, patient acuity, preceptors, level of supervision, and professional culture. Within each of those categories, themes were identified. The first clinical phase, the novice stage, encompassed the students' first three months of clinical education. The second clinical phase, the competent stage, encompassed the next eleven months, and the final clinical phase, the proficient stage, encompassed the last three months.

In each category, themes were identified for both the most beneficial and least beneficial experiences. The themes were identified from the students' descriptions of real-life experiences they described about their most and least beneficial experiences. In addition to the eight major themes, concepts arose that were important to the students but which did not fall into one of the eight major categories. These concepts were noted but no attempt was made to place them in a specific category.

Novice Stage

Clinical Experiences

From the experiences students in the first phase of their clinical education considered most beneficial, four major themes emerged (see Table 1). These themes were: a) Exposure to large numbers and varieties of cases, b) opportunities to develop a routine, c) being allowed to start developing a degree of autonomy, and d) having the time to prepare and develop a plan for scheduled cases.

Students in the novice phase of their clinical education emphasize the benefit of exposure to a large number and variety of cases as an introduction to the many learning opportunities available.

> "...what I liked about the hospital that I was at is, they did a variety of cases, from minor to pretty large cases, and they, their turnover rate, as far as the number of cases per room per day, was pretty high...I felt in that three months I had at least touched upon most of the different types of procedures that go on..."

Opportunities to develop a routine , or a "uniform" way of doing things is important in the early phase of clinical education. Beneficial experiences include those in which students are able to work frequently with the same preceptor or in an environment where there is little variation in technique between preceptors. This allows the students to develop a routine, a basis upon which to build as they progress through their clinical education.

Early in their clinical education, students identify the need to be allowed to start developing a small degree of autonomy.

> "...he would let me, every day, go a little bit further, go a little bit further, and he gave me rope as we went."

"When I first got there, there was somebody with me constantly, and as I progressed

through, they slowly kind of weaned that away..."

Also important in the novice phase is having the time to prepare and plan for scheduled cases. Knowing what their scheduled cases will be ahead of time, and having an opportunity to call staff members to discuss the anesthetic plan helps students to learn what is appropriate for a given case so that they can become increasingly comfortable with developing and carrying out their own anesthetic plans.

In the discussion of clinical experiences least beneficial to their education two themes evolved (see Table 2): a) A lack of opportunities to develop an anesthetic plan and b) experiences with being "on call" occurring too early. Students report that being assigned cases about which they are not informed in advance prevents adequate preparation and decreases the learning opportunities. Remaining at a facility overnight to manage cases on call also decreases the opportunities to read and prepare for procedures/cases that are new to the student, and for which they are responsible the following day.

"As a new clinician, it was difficult because you could not always prepare for everything that you were presented with...."

"In hindsight it wasn't beneficial to do the call cases, because I had enough to do during the day, and at night it would have been, it, that time would have been better spent recovering myself and reading for the, for the next day instead of staying there."

Case Types

A major theme identified among students in the first phase of their clinical education was that all types of cases are beneficial to learning, including some minor exposure to pediatric and obstetrical cases (see Table 1). No case type is more or less beneficial than any other.

TABLE 1. NOVICE STAGE

(Beneficial Experiences)

Clinical Experiences	**Case Types**
Large numbers/varieties	All types
Develop a routine	Minimal exposure to pediatrics
Start developing autonomy	and obstetrics
Time to plan/prepare for cases	
Anesthetics	**Procedures**
General anesthetics	Airway
Monitored Anesthesia Care	Airway
Regional anesthetics	Emergent intubations
	Insertion of arterial lines
Patient Acuity	**Preceptors**
ASA I	Foster academic environment
ASA II	Experienced
	Knowledgeable
	Willing to teach
Level of Supervision	**Professional Culture**
High initially, then	Interesting to watch
gradually decreasing	CRNA/MD interaction
	Good CRNA/MD interactions
	→ good learning experience

TABLE 2. NOVICE STAGE

(Less Than Beneficial Experiences)

Clinical Experiences	Case Type
Cases in which students are unable to develop a plan of care Call & ER experiences-too early to be beneficial	Overexposure to pediatrics and obstetrics
Anesthetics	**Procedures**
Highly complicated techniques Unorthodox techniques	Insertion of central lines and pulmonary artery catheters
Patient Acuity	**Preceptors**
ASA III, IV, and V	Impatient Nervous Condescending Non-academic
Level of Supervision	**Professional Culture**
Over-controlling	Working with both a CRNA and an MD→less learning occurs when there is more MD control

> "I learned from every case that came in."
>
> "It was nice to be exposed to pediatrics while some of it was, from the didactic, still fresh in my head."
>
> "The amount I did was good because it gave, it got my, got me introduced to the concept behind OB...."

The only theme identified in the category of least beneficial case types was that overexposure to specialty cases such as pediatrics and obstetrics is not beneficial to learning in the first clinical phase (see Table 2). The students report that because there will be an entire clinical rotation dedicated to both pediatrics and obstetrics later in their program, having a few cases by way of introduction is sufficient during the first three months.

Anesthetics

Three themes emerged for types of anesthetics that are beneficial learning experiences (see Table 1): a) General anesthetics, b) monitored anesthesia care (MAC), and c) regional anesthetics. Learning to administer general anesthetics is a high priority because "that's the mainstay of our practice". MAC cases are important because in this situation students develop the ability to provide an appropriate level of sedation, learning the resulting effect of both under and over-sedation.

> "I really needed to get a lot of MACs just to get an idea of how to control an airway and what happens when you go too far with too much sedation and what it's like to not give enough."

Regional anesthetics are an important technique to master for the students in this study because of the students' military background and common use of this technique by military providers.

The only theme which emerged in the category of least beneficial anesthetic types or

techniques (see Table 2) was those techniques that were complicated or unorthodox, such as the less frequently used "hanging drop" technique for placing an epidural or using a paramedian approach to epidural placement rather than the more commonly used mid-line approach.

Procedures

The most dominant theme that emerged in this category was airway management procedures, including exposure to opportunities to perform emergent intubations (see Table 1). A theme also identified was the desire for opportunities to insert invasive lines for arterial blood pressure monitoring. All students report feeling that mastering airway management is a primary goal in the first three months of their clinical education, and that all forms of airway management, such as mask management, laryngeal mask airways, and especially laryngoscopy, are important skills to learn in this phase. The ability to insert an arterial line is also a skill students need to begin developing.

The one theme which emerged in the category of procedures not beneficial to learning in the first clinical phase (see Table 2) is student insertion of invasive lines, such as centrally placed intravenous lines and pulmonary artery catheters. Students report that these skills are not necessary to master at this first phase of their clinical education. All report that while opportunities to do these procedures may be "nice to have", they are not critical, and in some cases could be overwhelming to them.

Patient Acuity

In the field of anesthesia, a patient acuity score is assigned based on the American Society of Anesthesiologists (ASA) classification which is a five category physical status classification system for assessing patient's preoperatively. A higher acuity, or ASA classification, may require increases in the level of invasive monitoring a patient requires, and increases the number of factors to be considered in developing anesthetic plans.

Students report that ASA I and ASA II patients are most beneficial to learning in their

first clinical phase (see Table 1). Morgan and Mikhail (1996) defines an ASA I patient as a "normal healthy patient" (p. 6), and an ASA II patient is one who has a mild systemic disease, but whose function is not limited by this disease. Students report starting out with ASA I patients and then progressing to ASA II patients as most beneficial to their learning during this phase, because healthy patients allow for more variety in anesthetic technique and allow more involvement by students in carrying out anesthetic plans. ASA II patients give students opportunities to develop their critical thinking skills without being overwhelming.

> "...it was nice because they get a lot of ASA I's, ASA II's, healthy kids, so I could see how a routine, so-called routine anesthetic is delivered...."
>
> "...to have a relatively healthy patient took a little of the edge off at first so that I, you know, it wasn't an added fear, for me."
>
> "The ASA IIs were probably the most beneficial, because they have a little bit of something to think about. They usually have some sort of disease process, that you had to learn about, going on, but they weren't so sick that it wasn't you taking care of them."

The theme, high acuity patients, emerged in the category of least beneficial experiences during the first clinical phase (see Table 2). Those with an ASA classification greater than II are reported to be less beneficial. Students report that, due to the more complicated status of higher acuity patients, they are less able to be involved in developing and carrying out anesthetic plans for these patients at this early phase of their clinical education. Also, as beginning clinicians, having to provide anesthesia to high acuity patients induces high levels of anxiety, which they find detract from their ability to learn.

Preceptors

When analyzing the qualities students considered most beneficial in preceptors to their learning in the first clinical phase, four themes emerged (see Table 1). Beneficial

preceptors are those who: a) Foster an academic environment, b) are experienced clinicians, c) are knowledgeable, and d) are willing to teach. In this category, students describe preceptors who make time to discuss cases prior to the start of the case, including discussion of advantages and disadvantages of various techniques, and give students opportunities to think. These preceptors are very knowledgeable and foster a discussion of the case, not simply ask questions.

> "They would make a point before each case to discuss what the case was, the anesthesia type, we were going to use, the risks and benefits of that anesthetic, and they went through little scenarios."

Students report that the more experienced clinicians are also those who are more willing to teach.

> "There was a gentleman that I worked with that was, had been doing anesthesia for thirty years, and he was very comfortable with what he did, and he was very comfortable with teaching..."
>
> "...what made him so good is that he was so comfortable with his own skills that he was able to step back enough to allow me to get into even a little bit of trouble and try and get myself out."
>
> "...that's what I really was looking for at that point, to have someone to allow me opportunity to learn to correct my mistakes..."

Four themes also emerged in students' descriptions of the characteristics of preceptors they feel are least beneficial to their learning in this phase of their education (see Table 2). The preceptors who are least beneficial are those who are: a) Impatient, b) nervous, c) condescending, and d) not interested in academic discussions. Preceptors who are nervous and/or impatient are described by the students as clinicians who are not comfortable with their own skills. These preceptors often do not allow students more than one opportunity to successfully accomplish a procedure, such as laryngoscopy, and

additionally will not take the time to explain what it is students should do differently.

> "...there were some people, the bad ones, if I put the blade in, and I barely lifted up, and I said I didn't see cords, they were like, get out, you're out of there..."

Condescending preceptors are described by students as those who believe there is only one way to do something, their way, and it is not correct if students do not do it their way. Students report feeling nervous and anxious when with these preceptors. Academic discussion of patients and cases is important and it is not beneficial to student learning when preceptors have no interest in fostering these discussions, or in responding to students' attempts at discussion.

Level of Supervision

In the first phase of their clinical education, students report the desire to have a high level of supervision (see Table 1). As education progresses and skills develop, there is a need for gradually decreasing levels of supervision correlating with gradually increasing degrees of autonomy. High levels of supervision in the beginning with a gradual decrease in the level of supervision throughout the first clinical phase is what students describe as most beneficial to their learning. It is less beneficial if this decrease in the level of supervision does not occur (see Table 2) . Students in this study report that the level of supervision each has received in their individual experience has been the appropriate level.

Professional Culture

A category of professional culture emerged in which students describe their experiences with working in the operating room with either a Certified Registered Nurse Anesthetist (CRNA) alone, an anesthesiologist alone, or with both a CRNA and an anesthesiologist. Under the heading of beneficial clinical experiences (see Table 1), the dominant theme that emerged, in the first phase of clinical education, when working with both a CRNA and anesthesiologist, is that they find it interesting to stand back and watch the interactions that occur between them. If a good working relationship exists between

the two clinicians, it is a good learning experience for the student.

Students in the first phase of their clinical education report that in working alone with either the CRNA or the anesthesiologist, each situation has aspects that are most beneficial to their learning in this phase. Initially, CRNAs are best to work with. CRNAs seem to better understand the needs of students, and are more willing to teach the basics of anesthesia. Students feel that having once been a SRNA themselves, the CRNAs have a feel for where the student is starting and what they need to know. Later, as students become more comfortable with their skills, and desire more autonomy, working with an anesthesiologist alone offers more opportunity for autonomy.

> "Initially, for the most part we worked with CRNAs, which I, I thought was good because they knew where we were coming from, they had a feel for where we were, our, our knowledge base initially was, and, and I felt like we could relate to them."

> "Working with just the CRNA was fine because it, at the beginning, because it taught me the practical aspects of giving anesthesia."

> "I liked working with just an MD towards the end because they frequently had other rooms, so they afforded you more autonomy."

In the category of least beneficial clinical experiences (see Table 2), students report that when working with both a CRNA and an anesthesiologist together, there is more control exerted by the anesthesiologist which results in less student learning. This is especially true when conflict exists on how to "run the case". If the CRNA and anesthesiologist have different ideas for the anesthetic plan, students often feel caught in the middle.

> "The problem came when you were doing more complicated cases where the MD was more involved because there was frequent conflict between the CRNA and the

> MD on how they wanted to run the case, and they would each talk to you, but not talk to each other, and you felt caught in the middle."

There are no aspects of working alone with a CRNA that are reported as being less beneficial to students, however, they do report that working alone with an anesthesiologist is, at times, less beneficial. When working alone with an anesthesiologist, they are often more interested in high level discussions, such as pathophysiology, rather than teaching the basics of anesthesia, which is more appropriate for the first phase of their clinical education.

> "I was, initially I was kind of somewhat intimidated by the anesthesiologists and I didn't feel comfortable discussing some things because I didn't feel like I knew enough so I didn't want to sound stupid...."

An important concept students at the novice phase report is that, although experiences with potentially poor patient outcomes is undesirable, and is a negative experience, it is important that students learn from the experience.

> "Even though it was a, somewhat of a negative thing, I learned from it, so, and I think from my experiences, although I don't want bad things to happen, I tend to, they stick in your mind, and I probably learn more from them than a number of good things happening..."

Competent Stage

Clinical Experiences

In the second phase of clinical education, four themes emerged in the category of most beneficial clinical experiences (see Table 3). These themes are: a) Replication of experiences, b) academic discussion of cases, c) opportunities for increasing autonomy, and d) on-call experiences and/or experiences providing coverage for the emergency

room. Students report that at this phase in their learning it is very important to repeatedly have the same types of cases in order to better learn the anesthetic management of a given case.

> "I think the thing that has helped me most over that period of time was replication, doing the same sort of case multiple times and getting to use the same anesthetic agents, and getting comfortable...."

> "...it's nice when you're in the GYN room and you do abdominal hysterectomy, vaginal hysterectomy, you know three or four in a row, and you can get the, you can get the sequence down."

Opportunities to discuss academic points of a given case are also reported as beneficial to their learning in this second phase. It is especially beneficial to discuss these issues prior to starting the case.

> "I found what was real helpful, the people that I was working with, is when they would ask me, okay what is your plan for the day? What are, what are you going to do, and we went over exactly everything, the, the, the muscle relaxant doses, if you were going to use, if you weren't, propofol, pentothal, your reasons why, all that stuff....

In this second phase of their clinical education, students report a need to have opportunities for increasing autonomy. They report feeling that it is beneficial to be left alone to care for patients so they can "start thinking on their own" and begin to more fully develop critical thinking skills. Also in this phase, students report that opportunities for "on-call" experiences or experiences in the emergency room are beneficial, because in addition to providing exposure to the anesthetist's responsibilities outside the operating room, they also help them to "learn to think quickly." Students can not be prepared ahead of time for situations that arise during their call shift or in the emergency room, so they have to learn to quickly decide how to best manage the situation.

"I think call is good, being on call is very beneficial because you never know what's going to come in, so you have to sort of learn to think quickly."

Students "on call" during the second phase find that call shifts in which their services are not required offer opportunities to study.

In the category of clinical experiences students consider least beneficial to their learning, no themes were identified. They find all clinical experiences to be beneficial.

Case Types

Themes identified in the category of types of cases most beneficial to the students' learning (see Table 3) include both difficult and challenging cases, especially complicated fluid management cases, and less difficult "bread and butter" cases. A theme that also emerged in this category is the desire for specialty cases, especially obstetrics. Students describe the more difficult and challenging cases as those in which there are multiple considerations for issues such as hemodynamics, fluid requirements, and pharmacology related to the specific procedure or medical condition of the patient. These cases require more critical thinking and push the students to learn.

"...when you get a little bit harder case as you go on and do your different rotations, ...your starting to think, your starting to, oh, well now I can understand why I'm doing...."

Learning to deal with the issues involved in the more complicated cases, such as why a particular patient responded to a given intervention in a certain way, helps the students have a better understanding of patient responses in less difficult cases. Less difficult cases, those which are done more routinely, referred to as "bread and butter" cases, are beneficial because doing these cases "over and over" helps students develop routines and become comfortable with procedures. Students report that cases they refer to as bread

TABLE 3. COMPETENT STAGE

(Beneficial Experiences)

Clinical Experiences	**Case Types**
Replication of experiences	Complicated fluid management
Academic discussion of cases	Difficult and challenging
Increasing autonomy	Less difficult ("bread and butter" cases)
Call & ER experiences are good-	i.e. laparoscopic cholecystectomy, GYN,
encourages quick thinking	ENT, orthopedics, etc.
	Specialty cases (Obstetrics)
Anesthetics	**Procedures**
All types	Advanced airway techniques
General anesthetics	Insertion of all invasive lines
Regional anesthetics	
Patient Acuity	**Preceptors**
ASA II	Encourages autonomy/independent thinking
ASA III	Willing to teach/seek out learning experiences
	Calm/confident
	Assesses student learning needs
Level of Supervision	**Professional Culture**
Need opportunities to be left alone	Good CRNA/MD interactions→
to care for patients	a more positive learning experience

TABLE 4. COMPETENT STAGE

(Less Than Beneficial Experiences)

Clinical Experiences	Case Types
None	Overexposure to pediatrics
Anesthetics	**Procedures**
Monitored Anesthesia Care	None
Patient Acuity	**Preceptors**
None	Those who do not teach Do not understand student learning needs Do not want to be with students
Level of Supervision	**Professional Culture**
Over-supervision	Adversarial CRNA/MD relationship → negative effect on learning

and butter cases are laparoscopic cholecystectomies, gynecological surgeries, orthopedic surgeries, and ear, nose, and throat (ENT) surgeries.

Opportunities for experience with specialty cases, especially obstetrics, are desirable and beneficial for learning in this second phase of their clinical education. Students report that having a full month clinical rotation to focus solely on the obstetrical patient is very beneficial to learning this specialty area of anesthesia.

> "We could really concentrate on obstetric anesthesia, spinals and epidurals, and anesthesia for the parturient. I think that was one of the most beneficial things."

Students report a primary benefit to having a rotation specific to pediatrics is that they become proficient in management of pediatric airways. In the category of least beneficial clinical experiences (see Table 4), students report that while it is beneficial to have a rotation dedicated to pediatrics, a rotation lasting more than one month is too long and less beneficial to their learning after that point.

> "First...I think it's a good rotation in that it's nice to be able to concentrate on that area, not just do a pediatric case every once in awhile. However, its not something that I think really should be three months long."

Anesthetics

Students report that experience with all types of anesthetics are beneficial but recurring themes identified are general anesthetics and regional anesthetics. The focus in the second phase seems to be less on epidural and spinal anesthesia and more on the need for experience with nerve blocks, such as brachial plexus blocks and leg blocks.

> "I think it's all important.....general anesthesia is very important....you know you want as many varied experiences you, you can have so you know how to handle the complications when they go wrong...."

"No, actually I think all of them are real good to do..."

"...general anesthetics or general anesthetics with a, with an endotracheal tube or with an LMA, either way, I think. Those are, or with a mask."

"I didn't get a lot of regional experience other than spinals and epidurals...as far as brachial plexus blocks, very few of those I've been able to do, and I think that would have been something nice to have had more experience in."

The only identifiable theme in the category of types of anesthetics that are least beneficial to the learning of students in this second phase (see Table 4) is MAC cases. Students report these are of questionable benefit during this phase of learning. A primary benefit of MAC cases is learning airway management, and in the second phase of learning, where students feel more proficient with their airway skills, these cases, which usually are less complicated and require less critical thinking, are less beneficial.

Procedures

Two themes emerged in the category of anesthetic procedures with which experience is most beneficial in the second clinical phase (see Table 3): a) Advanced airway management procedures and b) the insertion of invasive lines. Specific airway management experiences that are desired in this phase include experiences in managing a difficult airway as well as much more experience with performing laryngoscopy, and becoming proficient in intubating with multiple types of laryngoscope blades.

"Airway skills aren't tip top so, yeah, I'd say even those middle months, airway skills are paramount."

"Well, of course the more intubations the better, and trying different blades.."

Learning to use the fiberoptic scope for intubations is very beneficial at this phase and students report a desire for even more experience in this area.

The types of invasive lines students most refer to as beneficial experiences are arterial pressure monitoring lines and centrally placed intravenous lines, including those used for monitoring central venous pressure. Students also report that experiences with placement of pulmonary artery catheters are beneficial but a lower priority than either of the other two types of lines.

> "I would have loved that to have gotten more lines..."

> "A-lines, you get quite a bit of A-lines, so you feel like, I mean you can always use more."

> "Central line placement, being in the military, I think is, is very important..."

In the category of least beneficial procedures, there were no identifiable themes. Students report that experience with any procedure in the second phase of clinical education is beneficial to their learning.

Patient Acuity

As previously described, the patient acuity is determined based on the ASA classification assigned to the patient by anesthesia providers. Students report that in the second phase of their clinical education, the most beneficial learning experiences are administering anesthetics to patients designated as ASA II or ASA III (see Table 3). Patients in these two ASA classifications have some degree of underlying disease process to think about, using critical thinking skills. Each classification provides a different focus and offers different learning experiences.

> "...like the days that I have ASA IIIs and IVs on my plate you know I worked on pathophysiology things and pharmacodynamics and pharmacokinetics, working on those kinds of things for those specific types of patients, that days where I had

ASA IIs, Is and IIs I could focus on different things..."

"...when you start getting into ASA II and III patients where you have pathophysiology to deal with, then you really have to, that's when you start reaching back, thinking, making critical decisions."

No theme emerged in the category of patient acuity considered least beneficial to student learning in the second clinical phase.

Preceptors

In the second clinical phase, four themes emerged in the students' descriptions of preceptors who are most beneficial to their learning (see Table 3). Preceptors considered to be most beneficial are those who: a) Encourage autonomy and independent thinking, b) are willing to teach and actively seek out learning experiences for the student, c) calm and confident, and d) assess student's learning needs.

Those preceptors who encourage autonomy and independent thinking are those who are willing to give increased autonomy to students and let them attempt to correct their own errors in judgment.

"...the type person that I worked best with I think was a person...who had a pretty, pretty high threshold for panic, would let me fly..."

"...she thought that we learned a lot through making errors at this point, and that we benefited more from, perhaps putting the endotracheal tube in the esophagus than we did continuously getting into the trachea..."

"He kept giving increased autonomy, he would stay outside the room....and if I needed anything, he was right there, but he let me be in the room by myself, and it was just, it was a real good experience."

Preceptors who are willing to teach are those who are willing to discuss what they have in mind for managing the case and why, as well as a willingness to listen to students' ideas and to let them carry out their plan.

> "...one in particular that I was impressed with... came up and said...these are my thoughts...and this is the way I like to do it, this is what I'm thinking. I'm thinking this because of this, I'm using this because of this, I mean, and he kind of like told me his plan, and he says now what do you think?"

These are the preceptors who actively seek out learning experiences for students, allowing them the opportunity to take advantage of experiences. These are the preceptors who are able to accurately assess students' learning needs and point them toward the next step in their learning process. Preceptors who are calm and confident inspire an air of confidence in the students.

> "Calmness, competence, confidence, affability is nice but not necessary....you look for people to emulate."

> "And they're very good at assessing where you need to go, what's the next thing."

When discussing the characteristics of preceptors students consider least beneficial to their learning in the second phase, three themes emerged (see Table 4): a) Preceptors who do not teach, b) those who do not seem to understand students' learning needs, and c) those who do not want to work with students. These themes are all inter-related in that students find that staff members who do not really want to work with the student, despite their having been assigned together do not try to understand the students' learning needs and make no effort to teach, but only "going through the motions."

> "...when they don't want students..... they just go through the motions and you don't really learn anything, or if you learn it....it's just not what it could be... you're just sort of there on your own, nobody really wants you there and nobody really, nobody wants to teach you anything."

Level of Supervision

In this category, the themes that emerged were very straightforward and simple (see Table 3). Students describe their most beneficial experiences as those in which they are given opportunities to be left alone with their patients and allowed to make independent decisions in the anesthetic management. The least beneficial experiences (see Table 4) are those in which the students are highly supervised and not afforded the opportunity to be left alone or make independent decisions.

Professional Culture

In the second clinical phase, or competent stage, of clinical education, students again report the aspects of working with both a CRNA and an anesthesiologist together, working alone with a CRNA, and working alone with an anesthesiologist. In this phase, in the category of beneficial experiences (see Table 3), students report, as before, that when the interactions between the CRNA and anesthesiologist are positive, it results in a good learning experience. Students report beneficial aspects to working with a CRNA alone as well as working alone with an anesthesiologist. CRNAs are described as being more "helpful" to the student and more willing to teach. Anesthesiologists offer more opportunity for practicing autonomy.

> "I enjoyed probably working with the CRNAs more, they're more helpful, you know they are the ones taking care of the patient.....ninety percent of the time."

> "...I think there's benefits, sometimes, to working with just an anesthesiologist because, I mean, they really don't want to be doing the stuff anyway, so, you you know, they're happy to let you do whatever you want to do..."

In the category of less beneficial experiences (see Table 4), students report that if an adversarial relationship exists between the CRNA and the anesthesiologist with whom the

student is working, this relationship has a negative effect on learning. Students report that when both a CRNA and an anesthesiologist are in the room, and an adversarial relationship exists, students may be left to do everything while the two staff members compete about who can test the student the most, or argue over what needs to be done. Alternatively, students may not get involved in the case at all because staff members are trying to "prove something to each other" and are doing the cases themselves.

> "...you'll either go to one of two extremes. You are either in, on the hot seat, and they expect you to do everything, and both of them are, are really just plumbing the depths to test you. That, that's one extreme, and the other extreme is you don't even matter. They're doing the case....because one of them is trying to prove something to the other..."

> "Yeah, I think, I think there is definitely a adversarial relationship right now between a lot of CRNAs and anesthesiologists...sometimes there's an adversarial relationship there, and the time I had at.....which was the one where the nurse anesthetist said, you know, let....put in the line and the anesthesiologist said no, and they got into an argument....the patient was the one who didn't benefit from it."

There are no aspects of working alone with a CRNA that students describe as less beneficial to their learning. Although students enjoy the autonomy afforded by the opportunity to work alone with an anesthesiologist, they report that there is often no teaching going on at these times. Again relating to the issue of the existence of adversarial relationships between CRNAs and anesthesiologist, if this type of relationship exists, the students report that it can negatively influence their learning even when working alone with the anesthesiologist.

> "...working with just an MDA, it's, they expect you to work like a CRNA....more often than not, they're reading the Wall Street Journal or something."

> "...if you were a student CRNA, it was just almost like you were worthless..."

A concept that students identify as being important, but which does not fit into the emerging categories is that it is important to always "stay ahead of the game". Attention to detail is reportedly a critical component of learning; to anticipate problems before they arise. Students also report a desire for more direct contact with the university clinical faculty during rotations at their various clinical sites during this second phase of their clinical education.

Proficient Stage

Clinical Experiences

Six themes emerged in the category of most beneficial experiences during the proficient stage, or the last three months of students' clinical education (see Table 5). These themes are: a) Opportunities to establish independence, b) opportunities to independently sequence the events of an anesthetic routine, c) having a variety of experiences, e) ER and on-call experiences, f) opportunities to employ critical thinking, and g) opportunities to review the basic fundamentals of anesthesia.

Students report the importance, in this final phase of their clinical education, of being given opportunities to exert some independence in their practice and being allowed to make independent decisions regarding the anesthetic plan for a given patient, including formulation of the plan, sequencing the events required to anesthetize the patient, as well as any revisions to be made during the course of the case, based on critical thinking about the patient's responses to the anesthesia and/or the surgical procedure.

"When you're getting to the tail end of your program, I think it's important to have a faculty that will allow you to stand on your own, make some decisions..."

"...being able to have the autonomy to make clinical decisions based on, you know, on your knowledge, and to act on them independently, without having someone prompt you."

Students also report a need, during this last phase, for exposure to a variety of cases in

preparation for entering practice as a CRNA. These experiences give students opportunities to review the various procedures and techniques learned throughout the program and to review the basic fundamentals of the practice of anesthesia.

"...you need to have the opportunity to do a little bit of everything, because when you graduate, that's what you're gonna be expected to do..."

"...the fundamentals of anesthesia are what are most important...the basics of, anesthesia are really what I feel are the most important that you need to take with you out of school..."

Students also report that having opportunities to provide assistance in the emergency room or to be on-call are beneficial at this phase in their learning because this challenges them to pull from their knowledge base and apply the knowledge in situations they can not prepare for in advance.

"Call is excellent because there is minimal backup, so you have to, you have to think."

"...you weren't as prepared for them mentally as far as the book work behind and then looking up all the pathologies, and you had to learn to more fly by the seat of what you already knew..."

"...presents different situations that a lot of times you don't see during the day."

The only theme that emerged in the category of clinical experiences that were least beneficial to learning in the final phase was that it is not perceived as beneficial to have experiences in which students have too little autonomy (see Table 6).

Case Types

Students report that there are beneficial aspects to cases that are challenging and

complicated, as well as to cases that are considered less challenging in the last phase of clinical education (see Table 5). Opportunities for increased exposure to obstetrical cases are also important. The more complicated cases provide students with opportunities to review pathology and to work with the equipment required for more in-depth monitoring while the less complicated "bread and butter" cases, such as ENT or orthopedic surgeries give them opportunities to work on perfecting a routine for themselves.

> "...you get into vascular cases, and, ... you get into bigger cases, sicker people, which ...is good, but also ENT cases, I mean just at this point, you're still trying to develop a routine, so I found that any case could be beneficial."

> "Actually the most valuable might be the two on the opposite ends. You know either the more difficult, like maybe a lobectomy....that had a lot of pathology involved, you know and required a lot of ..... patient monitoring... But then on the opposite end, I kind of enjoyed .... some of the smaller cases..."

Students emphasize the important of experience with obstetrical patients, specifically labor epidurals and cesarean sections due to their anticipation that these skills will be in high demand at their respective job sites after graduation.

"So it was important to me, individually, to have competent skills with specifically labor epidurals and ...some C-sections and crash C-sections, if possible....because I knew that I would be expected to perform those where I was going".

"I think it's good to have a good solid experience in OB..."

Students report that in the final phase of their clinical education, there are no types of case that are un-beneficial.

TABLE 5. PROFICIENT STAGE

(Beneficial Experiences)

Clinical Experiences	Case Types
Opportunities to establish independence	Challenging and complicated
Opportunities to independently sequence the events of an anesthetic routine	Less challenging ("bread and butter" cases) i.e. orthopedics, GYN, ENT, general surgery
Variety of experiences	Increased exposure to obstetrics
ER & call experiences provide beneficial challenges	
Opportunities to employ critical thinking	
Opportunities to review the basic fundamentals of anesthesia	
Anesthetics	**Procedures**
General anesthetics (more laryngeal mask airway and mask cases	Advanced airway techniques
Epidural anesthetics	Very individualized (procedures individuals have not yet perfected)
	Insertion of invasive lines
Patient Acuity	**Preceptors**
Not relevant	Willing to teach
	Knowledgeable
	Encourage critical thinking and foster discussion
	Encourage independence
Level of Supervision	**Professional Culture**
Minimum level required	Desires colleagual status

TABLE 6. PROFICIENT STAGE

(Less Than Beneficial Experiences)

Clinical Experiences	Case Types
Over-supervision-too little autonomy	None
Anesthetics	**Procedures**
Very uncommon techniques	None
Patient Acuity	**Preceptors**
None	Over-controlling Inflexible
Level of Supervision	**Professional Culture**
Over-supervision	No aspects found un-beneficial

Anesthetics

Anesthetics that reportedly are most beneficial to students during the final phase of their clinical education are: a) Experiences with general anesthetics, especially those in which a laryngeal mask airway is used or in which the airway and anesthetic are managed by mask and b) experiences with epidural anesthesia (see Table 5). Administering general anesthesia by using a laryngeal mask airway provides opportunities for experiences with alternatives to intubating patients, and by having opportunities to manage a general anesthetic by mask, students are able to further develop their airway management skills.

> "...an LMA is a good case, I mean, in fact ... that is a general, I mean you're just not putting an endotracheal tube in..."

> "I think it's a good experience to use an LMA because it's part of the difficult airway algorithm, it's a viable alternative to intubating someone all the time..."

> "...a mask general case is a good challenging case. Actually holding a mask to a face for a period of time and, you know, hand ventilating the patient or assisting the patient to breathe, that's good."

The desire for experience with epidural anesthesia relates to the expectation of the need to perform labor epidurals, as well as the knowledge that regional anesthesia, especially epidural anesthesia is widely used in the military, the population to which the students in this study belong. The only theme that emerged in the category of types of anesthetics that were least beneficial to learning in this phase was that it is not beneficial for students to have experience with techniques that are rarely used (see Table 6).

> "...things that I knew I really probably would not be doing in my practice.."

Procedures

Although students report that experience with any procedure is beneficial during this phase, three themes emerged in the category of procedures with which experience was most beneficial to learning (see Table 5). The themes are: a) Advanced airway techniques, b) procedures which students have not yet perfected, and c) insertion of invasive lines. Students report a desire for experience with techniques used in airway management with which they have previously had little or no experience, such as using the fiberoptic scope or the light wand to intubate patients. Techniques used to manage patients during difficult intubations is emphasized.

> "...any additional airway techniques I could learn-light wand or a bullard or a fiberoptic."

All report a need for experience with procedures they have not yet perfected which includes a variety of experiences and is very individualized. Each student has different specific educational needs but all report that, in this phase, it is important to develop skills with procedures they have not had the opportunity to perfect in earlier phases. Experiences with the insertion of invasive lines is also reported as important in this phase, especially arterial pressure monitoring lines and inserting central intravenous lines. Students report that there are no procedures that are un-beneficial to their learning in this final clinical phase.

Patient Acuity

In this category, students report that there is no one ASA classification of patients that is more or less beneficial than any other to their learning. Variations in ASA classification are viewed as not relevant in the final phase of their clinical education.

Preceptors

Preceptors who are most beneficial to the students' learning (see Table 5) are

those who: a) Are willing to teach, b) are knowledgeable, c) encourage critical thinking and foster discussion, and d) encourage independence.

Students report that they benefit from working with preceptors who are knowledgeable and willing to share knowledge through teaching.

> "...she was very informative, she was knowledgeable, and she was willing to teach..."

> "There was one particular anesthesiologist who was particularly good at instructing during the case..."

> "...and you've got to be very knowledgeable to be able to know where they're going with that first step and think the second, third, and fourth step down the line...

Students also report it is most beneficial to work with those preceptors who encourage them to think, foster discussion to make them think, and encourage them to carry out the results of their thought processes independently.

> "...they would...let you figure out your own way and let you figure out what you could do and how you could handle certain situations and, and I learned a lot..."

> "Thinking's critical to what we do...preceptors that encourage that kind of thinking are, .. outstanding."

> "But, he was good for being available to answer your questions and also stimulating some discussion with you too....it's great if they carry you beyond the answers that you can give them, cause ...then it gets them to teaching a little bit."

Students' descriptions of preceptors who were least beneficial to their learning in this final clinical phase (see Table 6) were those who are: a) Over-controlling and b) inflexible. These preceptors are least beneficial to students in the final phase of their clinical education because these preceptors maintain tight control over every situation, so that students are not given the opportunity to practice independence. These preceptors

are also inflexible in that they do not allow students to try alternatives to their chosen method/plans

> "...was very much in control of everything you did, from how the patient laid on the table to where exactly the lead placement went..."

> "...a bad instructor. Those that never get their hands out of there, that are always reaching up to grab something...an instructor that never leaves you alone, always stands by your side, does everything for you, they didn't help you..."

> "...they aren't flexible to allow you to do things that also might work, and you know work...because they're so hung up on their own way of doing things."

Level of Supervision

One theme emerged in the category of the level of supervision that was most beneficial to students' learning in the final phase of their clinical education (see Table 5). Students benefit most from being given a level of supervision that is the minimal amount required. Students report a need to begin to be treated as if they were staff; to be left alone as much as possible to do things for themselves.

> "I feel at this point, at that point, you need to be, start to be oriented to what it's going to be like when you get out, and you need to be left alone to make the decisions by yourself."

One theme emerged in the category of the level of supervision that is least beneficial to students in the final phase of their clinical education (see Table 6). Over-supervision is least beneficial to the students' learning and level of preparation during their final phase of clinical.

> "...immediate vicinity availability is critical, but presence in the room, directing the, you know, pushing of the drugs, overkill, at this end, at this end of the program."

Professional Culture

One theme emerged in this category (see Table 5); students in the final phase of their clinical education begin to feel a desire for colleagual status, and being made to feel like a colleague by staff members is beneficial to their learning. There were no non-beneficial aspects of working with a CRNA alone, an anesthesiologist alone, or with both a CRNA and an anesthesiologist together. Students did report that various aspects of these situations had advantages and disadvantages, though all were learning experiences.

In the final phase of clinical education, the CRNA is the most preferred staff to work with, but students report situations in which they benefit from working with anesthesiologists as well. CRNAs are reported as being best at providing good learning experiences for students, and at times appear more caring for patients and more mindful of basic comfort measures.

"The docs don't learn comfort measures."

"Well, generally speaking, CRNA staff are hands down far and away the best at providing a great learning experience for the student nurse anesthetists....And probably the reason that is, is because they're nurse anesthetists and you're going to be a nurse anesthetist and so we support each other. Anesthesiologists, on the other hand, have a whole lot of other agendas...I have worked with some tremendous docs who made my learning experience great...they were more the exception than the rule...in general, almost as a rule, nurse anesthetists were caring souls, you know, they remember that they used to fluff a pillow..."

Types of learning experiences students have depend not so much on the type of provider the preceptor is, but more on the individual, and when working with both types of providers at once, the type of learning experience depends on the relationship those two staff members have with each other.

"...there were CRNAs that didn't teach and there were MDs that didn't teach, and

I didn't find a direct difference between working with an anesthesiologist versus a CRNA."

In the analysis of data reported by students in the final phase of their clinical education, some concepts emerged as important to the students but did not fall into one of the emerging categories. One of these concepts is consistency of environment and staff. Students report that it is beneficial to finish their last three months at the same clinical site where they began their first three months. They also report this is especially true if this site was a military facility because the anesthesia staff at military facilities, in general, allow more opportunities for autonomy than do the staff at non-military facilities. This desire for consistency also relates to university clinical faculty. Students report that it would be beneficial to have more consistent interaction with clinical faculty so that in those last three months of their clinical education, the faculty can help them focus on their weaknesses and develop these areas. A final concept that was noted is the desire for more time, in the final clinical phase, and especially near the end, to study for the certification exam in a non-clinical setting.

"If every student could start their first three months at a military facility, and if those students could go back and finish, at least maybe their last thirty days, at that same facility, they know the routine, they know the people, and, and then maybe they can, you know, at that point they can be left to almost practice independently as if, as if they were, you know, had graduated already."

"...I would liked to have had, maybe, was a little bit of extra time to study for boards.."

"...I also think what is important...is somebody, somebody following, somebody who knows your strengths and weaknesses...I think the person making the assignments needs to know the individual's strengths and weaknesses and also needs to be aware of what cases they don't have, so that they can help the person to, you know, identify the holes and, and fill them."

"...more consistency, maybe not, not rotating every thirty days..."

CHAPTER VI: CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this qualitative study, using grounded theory, was to describe the clinical experiences nurse anesthesia students find to be most and least beneficial to their learning at various defined points in their clinical education. Data was obtained through interviews with students who, having completed the described clinical phase, gave descriptions of their real-life experiences and how these experiences were either beneficial or less than beneficial to them. Constant comparative analysis was used to identify emerging themes and to develop categories for these themes.

Conclusions

Analysis of data revealed the similarities and the differences in the learning experiences students identify as most or least beneficial in each of three phases of clinical education. In the category of clinical experiences, students in both the novice and in the proficient phase report having a variety of cases as beneficial, but for different reasons. In the first clinical phase, the students want exposure to the various types of cases they will be learning over the next fifteen months, whereas in the final clinical phase, students want variety to serve as a review of the different types of cases just prior to graduation. In contrast, the students in the second clinical phase, or competent stage report that repetition of cases is beneficial. In all phases of clinical education, students report the importance of developing a routine and of developing autonomy, though the degree of autonomy desired differs and increases at each progressive stage. Students in the final clinical phase emphasize the importance of establishing independence in practice. Only in the first clinical phase do students report a need for extra time to prepare for cases. Students in the first clinical phase report that emergency room and on-call experiences are not beneficial, while students in both the middle and final clinical phase report these experiences are beneficial.

All types of cases, with only an introduction to pediatrics and obstetrics, are beneficial to learning during the first clinical phase. In both the second and final clinical phases, students report that both challenging and difficult cases, and less challenging "bread and butter" cases are important to learning, as well as obstetrical cases. Students in the second clinical phase report a need for pediatric experiences during that phase but that too long of a rotation dedicated only to pediatrics is not beneficial. Students in the final clinical phase report that there is no type of case that is un-beneficial to their learning.

Students in all clinical phases report general and regional anesthetics as types of anesthetics most beneficial to learning in the respective phases. Students in the first clinical phase also report that MAC cases are beneficial, whereas students in the second clinical phase report MAC cases to be of questionable benefit. Students in the first clinical phase report gaining no benefit in learning anesthetic techniques that are complicated or unorthodox, preferring to learn the most simple and commonly used techniques. Students in the final clinical phase report they gain little benefit from learning/practicing techniques they do not expect to use on a routine basis.

Airway management procedures and the insertion of invasive arterial and/or venous lines were common themes for the most beneficial procedures in all three phases of clinical education, but the degree of difficulty of procedures students desire experience with increases with each progressive stage. In the first clinical phase, only experiences with arterial pressure monitoring lines are perceived as beneficial, with other types of invasive line experience considered less beneficial. But in the second and final clinical phases, no procedures are considered un-beneficial. In addition to the experiences with airway management and invasive lines, students in the final clinical phase also think it is important to have experience with procedures they may not have yet perfected.

The level of patient acuity (based on ASA classifications) considered most beneficial increases as students progress from the first to the second clinical phase.

Students in the first clinical phase report that it is most beneficial to be assigned patients who are ASA I and ASA II patients, and that high acuity patients are least beneficial to learning in this phase. Students in the second clinical phase report patients who are classified as ASA II or ASA III are most beneficial to learning in this phase, and that there is no classification of patient that is not beneficial to learning. Students in the final clinical phase report that patient acuity is not a relevant issue for them. All ASA classifications of patients contribute to their learning.

In all three phases of clinical education, students report that preceptors who are most beneficial to their learning are those who are knowledgeable, willing to teach, and foster academic discussions about patients and cases. In the second and final clinical phases, students additionally report the most benefit from preceptors who encourage critical thinking and independence. Characteristics that students report as least beneficial in preceptors differ slightly in each clinical phase. In the first clinical phase, poor preceptors are those who are impatient, nervous, and not interested in academics. In the second clinical phase, poor preceptors are those who do not teach, do not seem to understand the needs of the students, or do not want to work with students. In the final clinical phase, poor preceptors are those who are over-controlling and inflexible.

A similarity in the three phases of clinical education is that students in every phase report a desire for gradually increasing autonomy, beginning with a slight increase during the first clinical phase, and progressing to a minimal level of supervision in the final clinical phase. Students report that the experiences that are least beneficial are those in which there is no decrease in the level of supervision.

In the discussion of professional culture, students in both the first and second clinical phases report that the type of relationship that exists between the CRNA and the anesthesiologist with whom they are working impacts their learning experiences. Positive interactions between the two staff members result in good learning experiences, whereas

the existence of adversarial relationships results in negative learning experiences. Students in the final clinical phase desire colleagual status observed between many CRNAs and anesthesiologists, and that though CRNAs are the preferred type of provider with which to work, the relationship between CRNAs and anesthesiologists has the least impact on learning in this phase. Students in both the first and second clinical phases report that working with CRNAs alone offers the best experiences for learning the basics of anesthesia, but that working with anesthesiologists alone offers more opportunities for autonomy, albeit with less teaching occurring in these instances.

Although similarities are noted in various areas of the three phases of clinical education, there are also many differences, indicating that the learning needs of the nurse anesthesia student in the clinical portion of their education change over time.

Relevance to Review of Literature

There have been no previous studies which address the clinical experiences of nurse anesthesia students from the perspective of the students in the way that this study does. In addition, previous novice to expert studies, such as those from Benner (1984) have not addressed the area of nurse anesthesia. Although the concept of novice to expert is a part of the model, a conceptual model for nurse anesthesia education (McAuliffe, 1993), that was the theoretical framework for this study, the core of the model is based on the work of Spiro, Vispoel, Schmitz, & Samarapungavan (1987), who studied knowledge acquisition and cognitive flexibility for learning in areas of complex content in ill-structured domains (Spiro, Coulson, Feltovich, & Anderson, 1988). In the development of this model, McAuliffe (1993) made recommendations for future studies. McAuliffe recommended that future research be conducted to help determine what types of cases and experiences should be included within each stage of the conceptual model. This study identified those types of cases and experiences.

The findings of this study both support and further develop McAuliffe's (1993) model

for nurse anesthesia education. According to McAuliffe, when students begin Phase II (clinical education), they have already established a nurse anesthesia declarative knowledge base, and have some aspects of a procedural knowledge base. It is not until the students have completed the novice phase of their education that they begin to establish a conditional knowledge base. Conditional knowledge (know when) requires combining the theory (know what) and procedure (know how) in order to carry out the actions required for a given situation. In this study, the experiences students found most beneficial during this phase of learning (Table 1) were experiences that contribute to their conditional knowledge base. McAuliffe shows that as students progress through the second or competent phase of clinical learning, through the use of metacognitive strategy students increase the overlap of declarative, procedural, and conditional knowledge. Findings in this study in the description of experiences students find most beneficial to their learning at this phase (Table 3) support this. In the final phase of learning, the proficient phase, the three types of knowledge, declarative, procedural, and conditional, almost completely overlap, indicating the students' ability to process all these types of knowledge into their decision-making. Again, findings from this study support this theory.

The findings of this study can be compared to similar, more limited, findings of previous studies. When Sherbinski (1994) looked at learning styles of nurse anesthesia students in a Masters of Science program, the predominant learning style was identified as that of "assimilator" (p. 44), which emphasizes inductive reasoning. Chipas (1995) also stressed the importance of including critical thinking skills in nurse anesthesia curricula. Similarly, the current study reveals the importance nurse anesthesia students attach to the need to learn critical thinking skills.

Ramsborg and Holloway (1987) had students describe their most positive or most negative learning experience, but unlike this study, they were only allowed to describe a single situation. In Ramsborg and Holloway's study, students reported that positive

experiences came from mastering new skills, working with confident instructors, and winning a degree of independence. Negative experiences resulted from a lack of opportunities to use their own techniques and having non-supportive instructors. In the current study, students also identify having independence and confident instructors as more beneficial. They identify instructors who are unwilling to teach and who do not allow students to practice a variety of techniques as less beneficial.

Welty and Murray (1993) published findings of students' perceptions about their experiences during their clinical education, but unlike the current study, used graded scales rather than qualitative studies to inquire about students' experiences. Students identified weaknesses in their education in areas such as regional anesthesia experiences, airway experiences, and invasive line placement. The authors recommended future studies to obtain additional, clarifying data. The current study identified similar experiences desired by students, further delineating specific types of experiences and at what phase of clinical education these experiences are most or least beneficial.

Recommendations

The data obtained in this study gives rise to two recommendations for future studies. One recommendation is to carry out a similar study, but rather than a sample population of anesthesia students, collect input from didactic instructors, and from CRNAs and anesthesiologists who mentor students. A second recommendation is to take the data obtained in this study and mask the information given about the phase to which the data refers. Present the masked data to a sample population and ask if they can identify the clinical phase. The sample population could be either anesthesia students, or mentoring clinicians. This could provide one measure of the significance of the differences in students' needs from the first phase through the final phase of clinical education.

A third recommendation is to use the data obtained in this study as a basis for selecting clinical sites for the students. For example, student evaluations of preceptors at

the various sites, based on the reported criteria for more or less beneficial preceptors, can help to determine the sites that provide the most beneficial experiences. Also, faculty evaluations of the experiences a site has to offer, compared to students' reported needs, would be beneficial.

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APPENDICES

Appendix A -Interview Guide

Appendix B-Consent Form

APPENDIX A: INTERVIEW GUIDE

APPENDIX A

Interview Guide

1. Based on the last three/eleven/three months of your clinical education, what do you feel were the most beneficial experiences in achieving the level of expertise you feel you should have reached during that phase of your education?
   a. Types of cases-ASA classification, gynecological surgery, etc.
   b. Types of anesthetic procedures-airway management (laryngoscope, intubation-direct, fiberoptic); central lines/arterial lines, pulmonary artery catheters; intravenous/general/regional anesthesia (specific agents, types of blocks, etc.); on-call experience (overnight?, compensation?); emergency room/code team coverage, etc.
   c. Interactions with instructors
      1. Instructor qualities that were most beneficial (exemplify with a story)
      2. Instructor qualities that were least beneficial (exemplify with a story)
   d. Interactions with staff
      1. CRNA alone
      2. Anesthesiologist alone
      3. CRNA/Anesthesiologist together
   e. Level of supervision provided
2. What were the least beneficial experiences at this phase?
3. Relate a story about a specific incident that was a particularly memorable learning experience.
4. What, if anything, would you have changed about your clinical experience during this phase?

APPENDIX B: CONSENT FORM

APPENDIX B

Consent Form

Clinical Experiences Nurse Anesthesia Students Find the Least/Most Beneficial to Their Clinical Education

I have been asked to participate in a research study investigating the experiences of nurse anesthesia students in clinical education. The purpose of this study is to identify and describe experiences the nurse anesthesia students find most and least beneficial to their clinical education. This study may help nurse anesthesia faculty to improve clinical education for their students. I have been asked to participate because I am currently a nurse anesthesia student in the clinical portion of my education. I am one of approximately nine nurse anesthesia students in this study. This project is under the direction of Captain Beverly D. Ostermeyer, BSN, a student in the Nurse Anesthesia Program at the Uniformed Services University of the Health Sciences and her thesis chairperson, Lt. Col. Maura McAuliffe, CRNA, Ph.D., USAF NC. There is no other sponsorship or funding for this project.

If I choose to participate in this project, I understand that I will be asked two general questions with additional follow-up questions aimed at clarifying my responses. I understand this interview will be either in-person or over the telephone, and both types will be recorded on audio-tape. The interview will last approximately 60 minutes. A brief follow-up interview will be conducted, if necessary, to clarify the data. The questions will focus on my experiences as a nurse anesthesia student during my clinical education and what I believe were the most and least beneficial aspects. I understand that there are no physical risks from participating in the study, however, I may experience some varied emotions associated with feelings the questions evoke. I understand that I may not be personally benefited by the study, though it is possible that reflection on my clinical experiences may benefit my continued learning/practice and the study may contribute to a better understanding of the needs of nurse anesthesia students.

I understand that my identity will only be known to Captain Ostermeyer and my confidentiality is guaranteed. The thesis committee will only know my interview number. A report of the study results will be submitted as a written thesis document and will also

be available to me. The researcher (Beverly D. Ostermeyer) has offered to answer any questions that I may have about my involvement in the study. All audiotaped and transcribed interviews will be maintained by interview number by the researcher, and the tapes are destroyed after transcription is complete. I understand that my participation is completely voluntary and that I may withdraw from the study at any time without penalty. My signature indicates that I understand and voluntarily agree to the conditions of participation described above, and have received a copy of this form.

Date Signature of Participant

Participant's Printed Name

Using language that is understandable and appropriate, I have discussed this project and the items above with the subject.

Date Signature of the Investigator

Printed name